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(71)Applicant : HOYA CORP

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(72)Inventor : NAGASAWA HIROYUKI
MITSUI HIDEAKI

(54) EMITTER FOR FIELD ELECTRON EMITTING ELEMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a field electron emitting element having a high-stability, high-efficiency electron emission characteristic by using a material added with a prescribed element dominating the conductive pattern of silicon carbide to silicon carbide as an emitter. SOLUTION: When one of group III elements such as B, Al, Ga, In and group V elements such as N, P, As, Sb, Si is added as an impurity to silicon carbide, the diffusion coefficient is extremely lowered, the stability as a field electron emitting element is improved, and the voltage required for electron emission can be lowered. The homogeneity of the work function based on the difference in crystal polymorphism by plane direction can be improved, the energy level of the added impurity is located in the conduction band of silicon carbide, and the current density emitted from an emitter is not affected by heat and light from the outside. The silicon carbide is manufactured by the vapor phase epitaxy method, and the impurity is added by thermal diffusion, ion implantation, or neutron beam radiation preferably at the additive concentration of 5-100ppm.

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